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ARTICLES

Research Paper

Full Length Research Paper

Finding the impact of foreign debt servicing on per capita income growth rate: A case study of Pakistan

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Among the wide array of macroeconomic problems confronted by Pakistan, foreign debt servicing, has occupied a substantial place. Persistent fiscal deficit since the independence, turned out to be the ground for various governments to rely on the internal or external borrowings. The acquisition of more external debt instead of internal resource mobilization results in higher level of debt stock. Due to soaring level of debt, Pakistan has been allocating a major chunk of resources to debt repayment, which is tarnishing its economic growth. The present study has been conducted to discover the impact of foreign debt servicing on per capita income growth rate of Pakistan for the period 1981 to 2010 by applying relatively new technique, called auto-regressive distributed lag (ARDL) of co-integration. The results confirm that the foreign debt servicing has adversely and significantly affect the per capita income growth rate of Pakistan in both short-run and long-run in the specified period. There is an ardent need for comprehensive policy on part of the government of Pakistan to salvage the economy of such a financial loss.

Key words: Per capita income, growth rate, debt, debt servicing, ARDL and co –integration.

INTRODUCTION

Pakistan is currently facing many economic and social issues which are collectively affecting the economic growth. The public debt and its servicing are the most crucial problems that Pakistan has been facing in recent years. Domestic and foreign borrowings are considered as normal phenomenon because countries at the initial stages of development need capital stock (Malik and Siddiqui 2001). Apparently, foreign debt increases the economic growth but if it gets accumulated beyond a specific limit, it can have devastating effects upon economic growth as proved by **(**Hasan 1999).

The poor countries like Pakistan are getting more and more loans just to survive but it creates dependency on donors. More debt is being acquired just to repay previous debt and it is neither being used for the development purposes nor for the human capital for-mation. Pakistan is spending its export revenues on debt servicing instead of utilizing it on human capital, investment in real assets and scientific research and development. Debt servicing is severely affecting econo-mic growth of Pakistan by eating up major share of resources. The high level of debt leaves no incentives for the government to carry out the macroeconomics reforms and good effective policies because returns from these reforms will only be used to pay back outstanding debt and its services.

The history of Pakistan has remained caught in the debt trap. Debt trap is a situation where a country takes

debt and to pay interest payments, it acquires more debt due to unavailability of resource. Foreign debt amount increased from US $37.24 billion as of June, 2006 to US $57.21 billion as of June, 2010, which shows an increase of 53.63%. In fiscal year 2009 to 2010, the elected government of Pakistan spent a large amount of US $ 3.112 billion on debt servicing out of which US $ 2.3 billion was paid as principal amount.

There are a host of factors, which have contributed towards this dependence on foreign debt including unbalanced and wrong economic policies, inefficient governments and misappropriation by the political and administrative elite of the country during many successive regimes in Pakistan. The current account deficits, fiscal account deficit, macroeconomic mismanagement, non-development expenditures of the successive governments are largely responsible for this high level of debt servicing.

According to former president of state bank of Pakistan Mr. Syed Salim Raza (2009), fiscal deficit is almost half of the total budget, which is the result of non-development expenditures and considered as the biggest problem of Pakistan after inflation[1]. The main heads of non-development expenditures include general administration expenditure on various departments of federal government, Law and order, defence expenditure, subsidies and debt servicing. Among all these, defence expenditures of Pakistan has been increasing in every budget with a constant rate and consuming a large share of income.

The fiscal deficit of Pakistan is around 5.4% of gross domestic product (GDP) and it has to rely again on foreign debt to fulfill this deficit. Most of the other countries around the globe fulfill their fiscal and current account deficit by mobilizing the internal resources or foreign direct investment but Pakistan always relies on foreign debt, which results in high debt accumulations. Debt servicing takes large benefits from the domestic economy as a large amount of foreign exchange reserve has been transferred to the lender countries. It reduces the country's ability to grow itself rather it raises its dependence on the lender countries.

The effects of the high debt can easily be observed by the budget allocation of Pakistan every year. Keeping in mind the severe effects of the debt repayments of the external debt, the present study investigates the impact of debt serving on the economic growth of Pakistan. The present study is organized as follows:

Following the strong background of Pakistan debt problem, review of the literature is discussed in second section, theoretical frame work and model specification is discussed in third section, methodology and estimation is discussed in forth section and estimation results and

findings are discussed in section five and section six contains conclusion followed by policy recommendations.

Review of literature

There are voluminous studies in the literature in which the effect of debt on economic growth has been highlighted. Some studies discussed the debt overhang conditions and some showed significant and negative effect of debt and debt servicing on economic growth. Sinha (1999) examines the relationship between investment, export stability and growth for nine Asian countries[2]. Generalized Johansen framework of co-integration was used to carry out results. Results suggest investment in these countries was positive and significant for the economic growth.

Dijkstra and Hermes (2001) concluded, by applying orthogonal least-squares (OLS) technique that uncertainty measure of total debt and long-term debt servicing payments by 104 HIPCs has negative and statistically significant relation with economic growth for the period of 1970 to 1998. Serieux and Samy (2001) analyzed how debt burden affects economic growth of 53 lower and middle income countries both directly and indirectly in the period of 1970 to 1999. The author also concludes that debt servicing negatively affects investment and economic growth. Karagol (2002) undertakes an empirical study to analyze the effect of debt servicing on economic growth of Turkey by applying Johansen co-integration technique. The author proves that debt servicing has negative relation with economic growth in short-run and long-run. Same is confirmed by Adesola (2009) for Nigeria and Malik et al (2010) for Pakistan.

Gupta et al. (2005) checks the expenditure composition and fiscal consolidation effect on the economic growth. Panel data was used for 39 underdeveloped countries by applying generalized method of moments. The results explore that reduction of 1% point in fiscal deficit to gross domestic product ratio led to average increase of 0.5% point in per capita growth. Wijeweera et al. (2005) empirically studies the checked relationship between external debt and GNP for Sri Lanka by applying Engle and Granger (1987) co-integration and extracellular matrix (ECM). Results suggests that the sign of debt servicing coefficient was negative and capital stock and human capital were having positive relation in short-run and long-run.

McGrath (2006) analyzes the impact of industrial development and financial deregulation on economic growth of Czech Republic, Hungary and Poland. Industrial development was found significant and positively affects economic growth in three countries. Industrial production unidirectional caused GDP for all three countries. Osinubi

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[1]http://www.nation.com.pk/pakistan-news-newspaper-daily-english-online/Politics/05-Feb-2009/Nondevelopment-expenditure-biggest-problem-SBP

[2] Indian, Japan, Malaysia, Myanmar, Pakistan, Philippines, Sri Lanka, South Korea and Thailand

et al. (2006) empirically examines how the budget deficit led to accumulation of external debt which affects the economic growth of Nigeria for the period of 1970 to 2003. The author explains the need for Nigeria to finance its fiscal deficit. Complete evasion of external debt as a means of financing budget deficits will not help the economy as debt at sustainable level leads to development. Hameed et al. (2008) verifies the debt overhang situation in Pakistan. Sultan (2008) empirically confirms the positive impact of industry value added on economic growth of Bangladesh by applying simple OLS for the period of 1965 to 2004.

After reviewing the literature, it can easily be evaluated that most of the studies have been conducted to check the effect of debt on economic growth. A fewer studies have been conducted to grasp the effect of debt servicing on single country's economic growth. The present study is conducted to fill the gap by checking the effect of foreign debt servicing along with some allied variables affecting on economic growth (in terms of per capita income growth) of Pakistan by using relatively new technique.

Theoretical frame work

The Pakistan economy has been undergoing severe economic pressure throughout the history. Pakistan has relied on the foreign debt to finance its deficit. The debt taken in the early decades was used appropriately which resulted in high growth and development of the economy. The situation started worsening after 1970's when the debt was not being used properly. The debt has devastating effect on the economic growth of Pakistan as its servicing is far more than its capacity. There are two main theories which elaborate the debt situation of an economy that is, debt overhang hypothesis and debt laffer curve. If the debt burden of an economy becomes so large that a country does not remain in a position to take additional debt to finance its future projects and even though these projects would be profitable enough to reduce indebtedness of a country over time. The debt laffer curve theory states that the higher level of debt stock is associated with the lower probabilities of the debt repayment. Debt overhang hypothesis seems to be in the sight for the case of Pakistan. The current capacity of the economy to repay its debt indicates that economy is in the second part of the debt laffer curve where expected repayments are decreasing with increasing debt stock. The effect of debt servicing can be interesting study to validate the above stated hypothesis for the case of Pakistan.

Model specification

The model is designed to investigate the effect of debt servicing on per capita income growth rate. The debt servicing variable has been taken as the main variable along with other potential variables which affects the per capita economic growth rate.

$$GrPCY = \beta_0 + \beta_1\, DS_t + \beta_2\, DI_t + \beta_3\, GrSEC_t + \beta_4\, GrIND_t + \beta_5\, FD_t + \text{C}_t$$

Where,

GrPCY= Growth rate of Per Capita Income
DS= Foreign Debt Servicing
DI= Gross Domestic Investment as percentage of GDP
GrSEC= Growth rate of Secondary School Enrolment
GrIND= Growth rate of Industry Value added
FD= Fiscal Deficit as percentage of GDP
C_t= Error Term

In the model foreign debt servicing has been taken as main variable which includes debt servicing payments of foreign medium and long term loans. The expected relationship between debt servicing variable and the economic growth is negative. Karagol (2002) proved the same negative relation for Turkey and Hameed et al. (2008) and Malik et al. (2010) for Pakistan. Gross domestic investment is defined as increase in stock of capital in an economy and it does not include deduction for depreciation which is previously produced. Here the ratio of gross domestic investment to GDP has been taken and a significant and positive relation is expected between gross domestic investment as a percentage of GDP and economic growth. The positive relation between domestic investment and economic growth for China was confirmed by Tang et al. (2008).

Growth rate of secondary school enrolment has been taken as proxy for the quality of human capital as used by Serieux and Samy (2001) and Clements et al. (2003). The positive and significant relation is expected between secondary school enrolment and economic growth as proved by Skipton (2007) and Afzal et al. (2010). The industry value added is the GDP share by industry or contribution of the industry to overall GDP. A positive and significant relation is expected between industrial value added and economic growth as industry is sharing major portion in the total production. The positive and significant relation between industrial development and economic growth was found by McGrath (2006) and confirmed by Sultan (2008). Fiscal deficit does always have a negative effect on the economic growth. Fiscal deficit increases the amount of debt and its repayment, which slows down the economic growth process. Expected sign of the coefficient of fiscal deficit is negative as proved by Gupta et al. (2005) for 39 underdeveloped countries.

DATA AND METHODOLOGY

Data set used in this study is comprised of last three decades (1981 to 2010). Annual data has been used and data up to the year 2008 has been taken from the world development indicators (WDI) CD-

ROM (2008) and the remaining two years data has been taken from the World Bank website. Data on few variables has also been taken from, various issues of economic survey of Pakistan. After the collection of data the next mandatory task is the test, to check the stationarity of the variables in order to apply an appropriate econometric technique. In the present study, two tests Augmented Dickey Fuller (ADF) and Kwiatkowski-Phillips- Schmidt-Shin (KPSS) (1992) have been applied to check the stationarity.

For the test of existence of long-run relationship (co-integration) among the variables, a number of techniques are available. A relatively new technique ARDL bound testing approach has been used in this study due to the shortcomings of others techniques, covered by this technique. This technique is based on the general to specific modeling and has been developed by Pesaran and Pesaran (1997), Pesaran and Smith (1998), Pesaran and Shin (1999) and Pesaran at el (2001). ARDL technique of co-integration has been used due to the problems with other techniques of co-integration like Engel-Granger (1987) and maximum likelihood based Johansen (1988) and Johansen and Juselius (1990).

ARDL has the advantage that it can be applied irrespective of the order of integration of the variables used in study. "ARDL can be used whether the variable is I (0), I (1) or fractionally co-integrated" (Pesaran and Pesaran 1997). An advantage of using ARDL approach of co-integration is that the relationship can be estimated by simple OLS once the order of ARDL is recognized. The ARDL approach is suitable for small sample size. Another advantage of using ARDL bound testing approach is that "it takes satisfactory number of lags to confine the data generating process within the general-to-specific framework" (Laurenceson and Chai, 2003). In comparison with other vector autoregressive (VAR) models, the ARDL model accommodates greater number of variables. Moreover, "a dynamic error correction model (ECM) can be obtained from ARDL through simple linear transformation" (Banerjee et al. 1993).

To apply ARDL bound testing approach first of all stationarity level of the variables has been checked through unit root tests. The variables must be I (0) or I (1) for the application of ARDL bound testing approach. After checking the order of integration of variables, existence of the long-run relationship between the variables has been checked by applying the F-test. The F-test has been carried out by the imposition of the restriction on the coefficients with null hypothesis that is, there exists no long run relationship among the variables and with alternative hypothesis that is, there exists long run relationship among the variables. If the F- statistics lies below the lower bound then null hypothesis is not rejected and if the value of F-statistics is greater than the upper bound then the null hypothesis is rejected. The results remain inconclusive if the value of F-statistics lies between the lower and upper bound then.

In the next stage ARDL equation is estimated where optimal lag length is chosen according to one of the Akaike information or Schwartz Bayesian, which are considered standard criterion for choosing the maximum lag length. After that long-run solution has been obtained for the selected lag length. Diagnostic tests have been applied to check the validity of the model. Lagrange multiplier test has been applied to check either problem of serial correlation exists or not. Ramsey's reset test has been used for the functional form, Skewness and Kurtosis test has been used for the normality and lagrangian multiplier test has been used to check the problem of heteroscedasticity in the data. The equation for the model is given as under.

$$\Delta \mathbf{GrPCY_t} = a + \sum_{i=1}^{m} b_i \, \Delta \, (\mathbf{GrPCY})_{t-i} + \sum_{i=0}^{m} c_i \, \Delta \, (\mathbf{DS})_{t-i}$$

$$+ \sum_{i=0}^{m} d_i \, \Delta \, (\mathbf{DI})_{t-i} + \sum_{i=0}^{m} e_i \, \Delta (\mathbf{GrSEC})_{t-i} + \sum_{i=0}^{m} k_i \, \Delta \, (\mathbf{FD})_{t-i}$$

$$+ \sum_{i=0}^{m} p_i \, \Delta (\mathbf{GrIND})_{t-i} + \delta_1 \, (\mathbf{GRPCY})_{t-1} + \delta_2 (\mathbf{DS})_{t-1} + \delta_3 \, (\mathbf{DI})_{t-1}$$

$$+ \quad \delta_4 \, (\mathbf{GrSEC})_{t-1} + \delta_5 \, (\mathbf{FD})_{t-1} + \delta_6 \, (\mathbf{GrIND})_{t-1} + \mu_t$$

Where 'i' to 'm' shows the selected lag length.

In the next stage the error correction model has been estimated by using the differences of the variables and the lagged long-run solution. The coefficient of the error correction term shows at which speed the variables return to the new equilibrium.

$$\Delta \mathbf{GrPCY_t} = \beta_0 + \sum_{i=0}^{m} \alpha_i \, \Delta \mathbf{GrPCY}_{t-i} + \sum_{i=1}^{m} \beta_i \, \Delta \mathbf{DS}_{t-i}$$

$$+ \sum_{i=1}^{m} \gamma_i \, \Delta \mathbf{DI}_{t-i} + \sum_{i=1}^{m} \delta_i \, \Delta \mathbf{GrSEC}_{t-i} + \sum_{i=1}^{m} \eta_i \, \Delta \mathbf{FD}_{t-i}$$

$$+ \sum_{i=1}^{m} \lambda_i \, \Delta \mathbf{GrIND}_{t-i} + \varphi \, \mathbf{ECM}_{t-1} + v_t$$

Finally the cumulative recursive sum (CUSUM) and cumulative recursive sum of squares (CUSUMSQ) tests are employed to check the stability of the short-run and long-run coefficients.

RESULTS

Estimation results and findings

Table 1, 2, 3 and 4 shows the results[3] of the augmented Dickey-Fuller and Kwiatkowski–Phillips–Schmidt–Shin (KPSS) unit root tests at level.

The unit root results at level suggested that DI and GSE were stationary at level. Other variables were checked at first difference and the results are given.

The table suggests that ARDL bound testing approach can be applied here because all the variables were stationary at level or at first difference. None of the included variable in the model were stationary at level two or at second difference.

After checking the stationarity level of the variables, the next step was to select the maximum lag length. Most widely used criterions to select the maximum lag length are Akaike Information and Schwarz Bayesian. The Schwarz Bayesian criterion had been used for this study for the selection of lag length.

The optimum lag length of 1 has minimized the values of AIC and SCH criterions. The SBC criterion had been chosen to select the lag order for ARDL bound testing approach over the AIC as it has low prediction error (Ma and Jalil 2008). The partial F-test had been applied in the study to check the long-run relationship among the variables. The null hypothesis for the test was that no long-run relationship exists among variables with alternative hypothesis that long-run relationship exists. The following table shows the long-run relationship results of bound test for the economic growth model. Table 4.

The results show that F-value was greater than the UB at 5 and 10 %t level of significance. This test provided the

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[3] Eviews 7, econometric software has been used to obtain results.

Table 1. Results of unit root tests at Level

Variables	Augmented Dickey- Fuller(ADF)		Kwiatkowski-Phillips-Schmidt-Shin (KPSS)	
	Intercept	Intercept and trend	Intercept	Intercept and trend
DS	-1.2742	-2.9135	1.2214	0.1083
FD	-1.6878	-2.9288	0.6704	0.1574
DI	-2.8824***	-2.8752	0.1145	0.0555*
GrSEC	-3.2729**	-3.3966	0.1742	0.0645*
GrPCY	-2.6873	-2.7982	0.6214	0.1917
GrIND	-2.5847	-2.8048	0.2963	0.0739
Significance Level				
1%	-3.6891	-4.3239	.73900	0.2160
5 %	-2.9718	-3.5906	0.4630	0.1460
10%	-2.6251	-3.2253	.34700	0.1190

Note. * Shows significance of the variable at 1% and ** shows at 5% ** and *** shows at 10%

Table 2. Results of unit root tests at first difference

Variables	Augmented Dickey- Fuller (ADF)		Kwiatkowski-Phillips-Schmidt-Shin (KPSS)	
	Intercept	Intercept and trend	Intercept	Intercept and trend
DS	-5.6463*	-5.5255	0.0412*	0.0416
FD	-4.0226*	-3.9493	0.1615*	0.0954
GrPCY	-4.5288*	-4.4183	0.1494*	0.0727
GrIND	-5.6257*	-5.6156	0.0588*	0.0527
Significance level				
1%	-3.6998	-4.3393	0.7390	0.2160
5%	-2.9762	-3.5875	0.4630	0.1460
10%	-2.6274	-3.2292	0.3470	0.1190

Note. * shows significance of the variable at 1% and ** shows at 5% ** and *** shows at 10%

base to apply ARDL technique of co-integration as it showed the existence of long-run relationship among the variables. As shown in table 5.

All the variables of the models had expected signs. The debt servicing coefficient showed that one million dollar increase in debt servicing results in 0.12% decrease in the economic growth. The logic behind this inverse relationship is that although Pakistani government takes debt to finance its projects or to retreat its deficit in balance of payment but as we know the whole amount of debt is not utilized for such purposes rather a very big chunk is paid back in shape of debt repayment. So such money being out of the flow (Leakage) of Pakistani economy, cast negative effect on economic growth. Question arises here is that, why debt is taken on some part of the developing countries like Pakistan? The answer lies in the fact that internal sources of revenue generation are not enough. So the developing countries should wake up from this ignorance and must avoid the horrors of debt and its repayment and try indigenous resource generation. These results were consistent with the results of study by Kargaol (2002) that also showed the negative effect of debt servicing on economic growth.

The fiscal deficit as percentage of GDP negatively affected the economic growth; one percent increase in fiscal deficit as percentage of GDP leads to 40 % decrease in the economic growth. A country does financial deficit due to short of revenue. So the purpose of fiscal deficit continue to use such capital for economic growth. But unfortunately, the capital so collected cannot avert the decree of the fate of developing countries unless they avoid mismanagement or corruption. It means no use of making fiscal deficit. Rather it causes harms to the growth rate of country like Pakistan. Industrial growth has played significant role in the economic growth of Pakistan. In the present study

Table 3. Lag selection criteria

Lags	Akaike information criterion (AIC)	Schwarz Bayesian criterion (SBC)
1	41.36181[*]	43.34203[*]
2	41.54019	45.25134

Note. * Shows minimum lag length

Table 4. Bound test for long-run relationship

F-statistics value	95% Confidence level		90% Confidence level	
	Lower bound (LB)	Upper bound (UB)	Lower bound (LB)	Upper bound (UB)
6.2771	3.1474	4.6350	2.5902	3.8808

Table 5. ARDL estimates, ARDL (1, 0, 0, 1, 0, and 0) selected based on Schwarz Bayesian Criterion GrPCY is Dependent Variable

Regressors	Coefficients	Standard Errors	T-Ratios	Probabilities
GrPCY(-1)	.23679	.11585	2.0440	.054
DS	-.0011592	.5599E-3	-2.0702	.051
DI	.0035118	.038510	.091193	.928
GrSEC	.084527	.051344	1.6463	.115
GrSEC(-1)	.11861	.054222	2.1874	.040
FD	-.40049	.20041	-1.9983	.059
GrIND	.24554	.085556	2.8699	.009
INPT	5.6117	2.0974	2.6756	.014

Summary Statistics

R-Squared	.78830	R-Bar-Squared	.7172
S.E. of Regression	1.4247	F-Stat. F(7,21) 11.1709	[.000]
DW-statistic	2.0207	Durbin's h-statistic -.071263	[.943]

industrial value added growth had been found highly significant. One percent increase in the growth rate of industry value added leads to 24% increase in the economic growth of Pakistan. Such result is also shown by McGrath (2006) and Sultan (2008). The industrial growth as the theories suggests is one of the strong indicators of economic growth. As we know when any industry promotes, it creates economic activities in the economy that is, other allied industries also get boost up. Hence employment is generated and demand for goods services, further increases, total national income increases and causes GDP per capita to increase.

Growth rate of secondary school enrolment in this study had has been taken as a proxy of human capital. The study has revealed that secondary school enrollment also influences the economics growth of Pakistan positively in the long run, as it had has been found highly significant. The background reason is that human capital can be tapped only through education, skill and training. An educated person becomes resourceful and finds ways to be productive. Hence as secondary school enrolment increases, it also causes an escalation in economic growth of Pakistan

The domestic investment coefficient had has been found positive but insignificant for the economic growth. Domestic investment means a step toward prosperity because investment is also accompanied by employment and twin increase in employment and output accelerates the pace of economic growth of a country. The value of R-square showed that 79 % of total variation in the economic growth had been explained by the independent variables. The value of R-bar-square shows the goodness fit of the model adjusted to the degree of freedom and it had a value of 0.72 in this model.

The Durbin's h-statistic had been used to check the problem of auto correlation. From the results, it can safely

Table 6. Diagnostic tests results

Problems	Applicable tests	Chi-square(X^2)/F statistics	Probabilities
Serial Correlation	Lagrange multiplier	.033738	.854
Functional Form	Ramsey's RESET	.83957	.360
Normality	Skewness and kurtosis of Residuals	.071453	.965
Heteroscedasticity	White	1.1993	.273

Table 7. Estimated long run Coefficients, ARDL (1, 0, 0, 1, 0, 0) selected based on Schwarz Bayesian criterion, GrPCY is dependent variable

Regressors	Coefficient	Standard errors	T-ratios	Probabilities
DS	-.0015188	.6818E-3	-2.2276	.037
DI	.0046014	.050267	.091540	.928
GrSEC	.26616	.10768	2.4717	.022
FD	-.52474	.27276	-1.9238	.068
GrIND	.32172	.11030	2.9169	.008
INPT	7.3528	2.5222	2.9153	.008

Table 8. Error Correction Representation For The Selected ARDL Model, ARDL (1,0,0,1,0,0) selected based on Schwarz Bayesian Criterio, GrPCY is Dependent Variable

Regressors	Coefficients	Standard Errors	T-Ratios	Probabilities
dDS	-.0011592	.5599E-3	-2.0702	.050
dDI	.0035118	.038510	.091193	.928
dGrSEC	.084527	.051344	1.6463	.114
dFD	-.40049	.20041	-1.9983	.058
dGrIND	.24554	.085556	2.8699	.009
Ecm(-1)	-.76321	.11585	-6.5882	.000
R-Squared	.74026	R-Bar-Squared		.65368
DW-statistic	2.0207			

be said that problem of auto correlation does not exist in the data. As shown in table 6.The diagnostic tests had been applied for the robustness of results. The results, indicates that the data is not suffering from the problem of serial correlation. The results confirmed the normality of the data set and correct functional form of the model. The white test showed that the error terms had constant variance, which confirmed the absence of hetero scedasticity.

Table 7, shows the long-run coefficients of the variables by applying ARDL. All the coefficients had expected signs. One million dollar increase in debt servicing leads to 0.2 % decrease in economic growth in the long-run. As expected, the school enrolment had long-run positive effect on the economic growth. The positive and significant relationship between growth rate of secondary enrolment and economic growth was also confirmed by Skipton (2007) and Afzal et al (2010).

Fiscal deficit as percentage of GDP had long-run significant and negative effect on the economic growth. In the long-run, one percent increase in the fiscal deficit as percentage of GDP leads to 52 % decrease in growth rate. Gupta et al. (2005) also confirms the same in his panel study. Growth rate of domestic investment had been found insignificant in the long-run. The industrial value added had been found to have a positive and highly significant relation with the economic growth, which was also confirmed by Sultan (2008). One percent increase in the growth rate of industrial value added caused causes 32 percent increase in the economic growth.

Table 8, reveal that error correction term had been found highly significant. The negative sign with ECM shows the convergence of the dependent variable general practitioner for children and the young (GPCY) towards long-run equilibrium path in response to the changes in

Plot of Cumulative Sum of Recursive Residuals

The straight lines represent critical bounds at 5% significance level
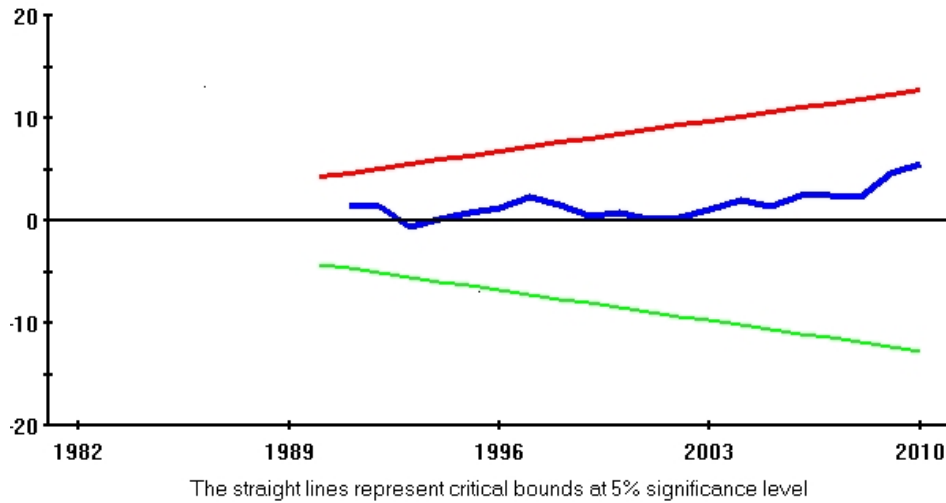
Figure 1. Plot of cumulative sum of recursive residuals

Plot of Cumulative Sum of Squares of Recursive Residuals

The straight lines represent critical bounds at 5% significance level
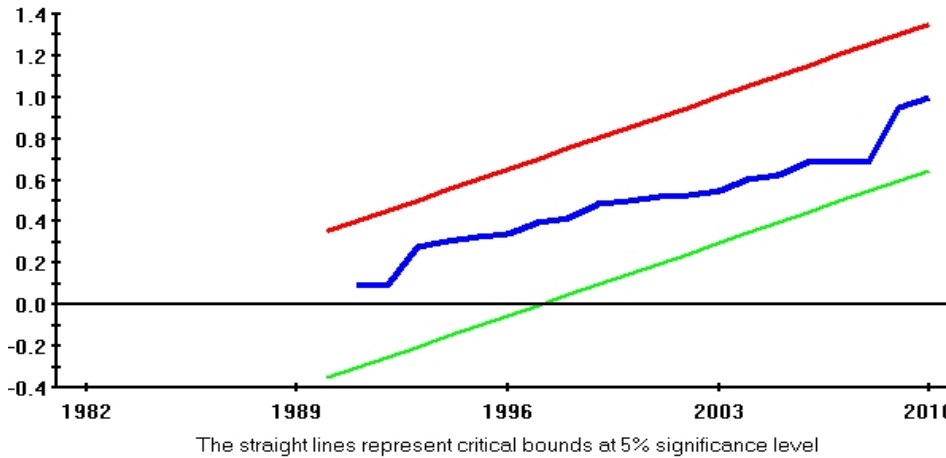
Figure 2. Plot of cumulative sum of squares of recursive residuals

the independent variables in the model. The ECM (-1) had been found significant at 1% level with coefficient equal to -.76321. The coefficient of ECM (-1) confirmed the co-integration among variables and deviation from the equilibrium level of economic growth during current period will be corrected by 76.32 % in the next period.

The CUSUM and CUSUMSQ tests confirmed the stability of the model if the test representing line stays within the critical bounds at 5% level of significance. The graphs of the CUSUM and CUSUMSQ tests had been presented in Figure 1 and 2. **T**he results of both tests confirmed the correctness of parameters of short-run and

long-run variables for growth rate and also verified the structural stability of the model.

CONCLUSION AND RECOMMENDED POLICIES

In the literature, most of the studies on Pakistan have tried to explain the effects of the debt on economic growth. A few numbers of studies have been conducted to check the effects of debt servicing on the economic growth of Pakistan. High levels of debt repayments are negatively affecting the growth process in Pakistan. High

levels of debt accumulation over the last few decades and its repayments have become a burning issue in recent times. The paper aimed to check the impact of debt servicing on the economics growth of Pakistan by taking data of last three decades. The ARDL bound testing has been applied and results showed that debt servicing has affected economic growth in the long-run more than the short-run. The reduction in economic growth had been found to be 0.12 and 0.15 % in the short-run and long-run respectively due to one million dollar increase in the debt servicing. The results highlight the need of less reliance on the foreign resources and the importance of domestic resource mobilization. The industrial value added growth had been found positive and significant in both short-run and long-run in the economic growth model, which needs special attention in policy making.

The growth rate of secondary school enrolment had been found highly significant for growth model in the long-run. The fiscal deficit impact had been found negative and significant on economic growth of Pakistan. The fiscal deficit in Pakistan is due to non-development expenditure, the defense expenditures and interest payments, which are more than the development expenditures. The debt dependence policy always put extra pressure on the domestic resources. By acquiring more and more foreign debt with strict conditionalities[4], the economy is falling into a debt trap[5].Keeping in view the results of the present study following policy recommendations can be helpful to enhance the growth rate and to tackle the rising problem of the debt.

The government of Pakistan has been spending major share of its revenues for the non-development expenditures which has brought fiscal deficit to the level of 50% of the total budget for the year 2010 to 2011. The government has to finance its projects by printing new money which not only creates inflation but also crowds out investment due to increase in the interest rate. The proper resource utilization is need of the time in education and health sector and institution building and reconstruction.

Pakistan is blessed with affluent human capital which can be used for the self-dependent macro-economic performance. The quality education, training, research and development (R & D) facilities can enhance efficiency of the labor force and help to increase productivity, which will ultimately lead to the higher growth with lower costs of production. The industry value added of Pakistan is 25% of its GDP; this sector has great potential to contribute more in the GDP of the economy. Proper attention and policies are needed to give it a boost.

Conflict of Interests

The authors have not declared any conflict of interests.

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[4] The conditions related to the acquisition of debt especially from IMF
[5] The accusation of more debt to repay the previous debt

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Full Length Research Paper

Factors influencing consumers' preference for local rice in Nigeria

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This study applied a multinomial logistic regression in examining factors driving consumer preference for locally produced rice in Nigeria. The data for the study were collected in Niger and Ekiti states in 2008 under the post harvest study programme of Africa Rice (EX-WARDA). Results of the various analyses underscored the significance of socio-economic factors as major drivers of consumer preference for local rice in Nigeria. Five of the coefficients of the explanatory variables (age, marital status, education of household head, primary activity of household head and sex of household head) significantly influence the consumer preference for Pategi relative to Aroso (imported rice). Similarly, five variables (age of household head, educational status of household head, and sex of household head) influence significantly, consumer preference for Igbemo relative to Aroso. Aside socio-economic variables, other factors found to have influence on consumer preference are frequency of purchase and price. In spite of the various types of local rice available in the markets, majority of consumers can identify different types based on their physic-chemical characteristics. Nevertheless, the two most highly rated criteria for selection of rice bought in the market are whiteness and absence of foreign materials. Further analysis also confirmed that about 82% of Nigerian eats rice at least once in a day. The significance of the socio-economic variables is an indication that policies and programmes for the development of the Nigerian rice sector should, in addition to enhancing the physico-chemical characteristics of rice, include value reorientation and sensitization of the people on the nutritional qualities of local rice.

Key words: Factors influencing, socio-economic, local rice, Nigeria.

INTRODUCTION

There are quite a range of diverse socio-cultural factors underlining the consumption pattern and consumer preference for rice in Nigeria. These factors, however, vary across the various geo-political zones in the country. Aside, the significance of physical and organoleptic characteristics of rice can also not be under-emphasized in this respect as they often determine different types of menu that can be prepared from rice. Thus, several dishes are known to be prepared from different types of local rice in Nigeria. The consumption and utilization of various types of local rice also vary across the country depending on the divers' traditional food consumption patterns in the country. Different local dishes prepared from rice also have different type of rice suitable for its preparation. Probably for the choice of taste, colour and stickiness after cooking some consumers prefer certain

Table 1. Study areas and number of samples.

State	No of LGA	No of community per LGA	No of sample per community	No of samples per state
Ekiti	2	2	50	200
Niger	2	2	50	200
Total	4	8	200	40

type of local rice for a particular dish. However, information as regards what informed consumer choice of a particular type of local rice is still lacking. Aside, information of the effects of various factors that are likely to influence the choice of local rice selected by consumers is also not available. Yet, such information is necessary not only for the purpose of rice quality improvement but also for strategic planning of rice sector in Nigeria. Different physico-chemical characteristics of rice are usually considered by rice consumers when making their choice of different types of rice bought in the market. This study, therefore, investigates the criteria that are normally considered when making the decision of the type of rice to be purchased in the market.

METHODOLOGY

Data collection

The underlying data used for this study was derived from a survey carried out as part of the post harvest study conducted under the programme of increasing the quality and competitiveness of locally produced rice in sub-Saharan Africa through the use of New Rice for Africa (NERICA) and the promotion of improved post-harvest technologies sponsored by the **Africa Rice (EX-WARDA).** This study adopted a systematic random sampling technique for the selection of the representative samples from two states in Nigeria (Ekiti and Niger states) bearing in mind the divers' socio-cultural and traditional food consumption patterns in the country and also ensure geographical representation of the samples. Ekiti is situated in the Southern part of the country while Niger state is located in the Northern part. The traditional consumption patterns across the country is such that the Northern states are mainly cereal based while the Southern states are mainly tuber based though rice consumption across the country is fast increasing. Thus, from each state, two rice producing Local Government Areas (LGAs) were purposively selected. From each LGA, one urban and one rural community were chosen. From each community, representative samples of 50 rice consumers were selected using systematic random sampling approach. Thus, at least 100 samples were drawn from each LGA making a total of 200 respondents per state as shown in Table1.

ANALYTICAL TECHNIQUE AND MODEL SPECIFICATION

Model specification and estimation procedure

Estimating multinomial logistic regression requires that one category of the dependent variables is chosen as the comparison category. Separate relative risk ratios are determined for all independent variables for each category of the independent variable with the exception of the comparison category of the dependent variable, which is omitted from the analysis. Hosmer and Stanley,

2000; Hilbe, 2009). In this case, 'Aroso' which is a brand of imported rice was chosen as the base category and all other type of the local rice are compared with the base outcome. The empirical form of the multinomial logic model is given below.

Model

$$\Pr(y_i = j) = \frac{\exp(X_i\beta_j)}{1 + \sum_{j=1}^{J} \exp(X_i\beta_j)}$$ 1

and

$$\Pr(y_i = 0) = \frac{1}{1 + \sum_{j=1}^{J} \exp(X_i\beta_j)},$$ 2

Where the ith is individual, y_i is the observed outcome (different types of local rice) and X_i is a vector of explanatory variables. The unknown parameters β_j was typically estimated by maximum likelihood using STATA package. The explanatory variables used in this study included; income, price, physico-chemical characteristics of rice, frequency of consumption, sex, age, level of education, marital status, primary activity, and length of residency in the community among others.

Marginal effects (MEs)

For an unordered multinomial model, there is no single conditional mean of the dependent variable, y. Instead there are m alternatives, and the probabilities of these alternatives can be modelled (Cameron and Trivedi, 2009). Interest lies in how these probabilities change as regressors change. For the multinomial logit model, the MEs can be shown to be:

$$\frac{\partial p_{ij}}{\partial x_i} = p_{ij}(\beta_j - \overline{\beta_i})$$ 3

Where $\overline{\beta} = \sum_l p_{il}\beta_l$ is the probability weighted average of the β_l. The marginal effects vary with the point of evaluation, x_i because P_{ij} varies with x_i. The signs of the regression coefficients do not give signs of the MEs. For a variable x, the ME is positive if $\beta_{ij} > \overline{\beta_i}$.

RESULTS AND DISCUSSIONS

Socio-economic characteristics of rice consumers in Nigeria

Sex of respondents: The sex of the head of the house

hold, play a significant role not only in the quantity of food consumed by the household but also in the type and quality and form in which such food is consumed. A female- headed household is likely to be more conscious of the quality and the combination of different variety of food consumed by the household than male-headed household. There is a significant variation between the North and the South as indicated by the data from Niger and Ekiti states. While virtually all the sampled household in Niger state are male-headed (99.0%), a significant proportion of sampled households from Ekiti state are female-headed (30.2%).

Age of respondents: The average age of rice consumers as shown by the analysis of samples from the two states in Nigeria ranges from 49 years in Ekiti state to 43 years in Niger state with a national average of 46 years. In both cases, however, the average age of respondents falls within the actively working population. While younger children will prefer food with high protein nutrients for growth, those in the active working age may prefer calorie supplied food such as carbohydrates. The old age group on the hands may just require a maintenance ration.

Marital status of respondents: Marital status plays a major role in the household feeding patterns. A single or unmarried individual may or may not have any feeding pattern as he or she can choose to eat away from home and the choice of food may be dictated by whatever is available at the eating point. A married person cultivates the habit of eating at home as a way of socializing with the family members. This will definitely affect the type and quantity of food consumed by the household. Analysis of data shows that over 90% of the representative samples of rice consumers from the two states are married. About 8% of representative samples from Ekiti state are single while insignificant proportion of 1.5% are widows or widowers.

Year of residence of respondents: It is possible for consumption patterns to change over time with year of residence of individual in a particular community. Even though individuals will have preference for their traditional foods, taste and preference change with location over time. Thus, a northern resident of southern origin in Nigeria may change his or her consumption pattern from tuber-based to cereal-based having stay for some time in the north. In this study, it was found that the average residency period of respondents was about 33 years which is long enough for them to have imbibed the food consumption tradition of their respective communities.

Level of education of respondents: The level of education of household head has serious implication for the type and quality of food consumed by the households. A highly educated household head will prefer a small

quantity of variety of foods with different nutritional contents (balance diet) to a bigger quantity of low nutritional components. The survey revealed that a significant proportion (36%) of the respondents in Niger state had no education compared to (1%) for Ekiti state. A sizeable proportion of the respondents, however, had secondary and post secondary education while about one-third of the respondents had primary education.

Primary activity of respondents: People in wage employment do mix and interact with people in the public almost on daily basis, the tendency to acquire knowledge of various kinds of food and nutrition is high. In most cases, such knowledge influences their food consumption pattern. Available evidence from this study showed that majority of the respondents (about 84%) from Niger state are farmers as against 16% recorded for Ekiti state. A significant proportion of the respondents in Ekiti state are traders (37%) and government workers (17%). For those who engage in non-farm as their primary activities, are close to 40% of them also took up farming to augment their income and household food consumption. A detail of socio-economic characteristics of respondents is presented in Table 2.

Identification of different types of rice by the consumers

One of the major objectives of this study is to find out the ability of rice consumers to identify different types of rice in the market based on some of their physico-chemical characteristics. Ability of consumers to identify a particular type of rice will depend on whether such consumer have eaten that type at least in the last 12 months, frequency of consuming that particular type and the source of such rice. This study investigated these criteria and some other related ones and the result of the analysis is presented in Table 3. From Table 3, virtually all the respondents (99.5%) can identify the different rice types they consumed as they have all eaten them in the last 12 months. In terms of frequency of consuming this rice type the table shows that about 82% of the respondents consume them on daily basis while another 14% even consume them about twice in a day. There was no significant variation in responses among respondents from both states. The sources of the various types of rice consumed by the respondents, however, presented a different picture. While, all the respondents from Niger state claimed they produce the type of rice they eat, virtually all respondents from Ekiti state buy from the market. In terms of the internal market dynamics for local rice in country, Niger can be classified as one of the net rice producing states while Ekiti is usually considered as one of the net rice consuming states. This is a true reflection of the marketing channel for local rice in Nigeria as most of the local rice consumed in the south is

Table 2. Summary of socio-economic characteristics of rice consumers.

Socio-Economic Variables	Ekiti	Niger	Average
Sex of respondents (%)			
Male	69.8	99.0	84.4
Female	30.2	1.0	15.6
Age (mean) years	49	43	46
Marital status			
Married	90.9	99.5	95.2
Single	7.6	0.5	4.0
Widow/Widower	1.5	0.0	0. 8
Year of residence in the community (mean)	33	32	32.5
Level of Education			
Primary	39.9	23.6	31.7
Junior secondary	7.1	2.0	4.5
Senior secondary	30.3	12.6	21.5
Post secondary	10.1	9.5	8.8
No Education	1.0	35.7	18.3
Can read and write	7.1	5.5	6.3
	4.5	11.1	7.8
Primary activity of respondents			
Agriculture	16.1	83.7	48.9
farm manager	7.8	0.5	4.1
trade	37.3	0.0	18.6
artisan	4.7	3.6	4.1
government workers	16.6	9.7	13.1
nothing	5.2	0.0	2.6
student	6.7	2.6	4.6
others	5.7	0.0	2.8

Source: Field Survey, 2008

brought from the north even though some of the states in the south also produce rice in appreciable quantities.

Criteria for selection of rice bought by respondents

Different rice physico-chemical characteristics have been chosen by rice consumers as a way of identifying and recognizing different types of rice bought in the market. This study investigated the criteria that are normally considered when making the decision of the type of rice bought in the market. The distribution of respondents by first criterion for selection of rice bought in the market is presented in Table 4. Two of these criteria rated high in both states. While almost half of the respondents in Ekiti state indicated absence of foreign matter as their first criteria, 48% of respondents in Niger state rated whiteness as their first criteria. Above all, these two criteria have to do with the physical appearance (pre-cooking properties) of the commodity. Surprisingly, price

is one of the list criteria usually considered in the selection of local rice bought by the consumers. The reason why price was not rated high among the criteria may be due to the fact that there is usually no significant difference in prices of the various types of local rice sold in the market. The above criteria were applied to the selection of different types of rice consumed in both states and the result is presented in Table 5 for Ekiti state and Table 6 for Niger state. For the consumers of Aroso, the most significant criterion for selection is absence of foreign matter. The consumers of Pategi and Igbemo, however, considered their taste as the most important criterion for selection. It should be noted that Aroso is imported rice while pategi and Igbemo are local rice in Ekiti state. Thus, it is obvious that the most important discriminating factor between imported and local rice is the absence of foreign matter as consumers of local rice found a better taste in the its consumption. Similar result is observed in Niger state where, those who consumed Manbechi, Lalangba, Malelisa, Bisilayi and Nnagbati considered taste as the most important criterion for selec-tion and those who consumed Ebangichi and Dokochi considered ease of cooking and whiteness as the most important criteria respectively. Thus, in terms of the physical characteristics of local rice in Nigeria, absence of foreign matter and whiteness were generally consi-dered as most important criteria for selection by the consumers while for the chemical characteristics, taste and ease of cooking were considered as most important criteria.

Income distribution and type of rice consumed

Income dictates to a large extent the consumers' choice of goods. A rational consumer will make a right choice of superior and high quality goods as income increases. Similarly, there is a high tendency that rice consumers in Nigeria are likely to consume more of high quality imported rice as their income increases. In this study, therefore, efforts were made to investigate the type of rice consumed by consumers in various income classes and the result is as shown in Table 7. The classification of income into three groups is to reflect the three socio-economic classes in the country. The minimum wage in Nigeria is currently at N18, 000 per month and anybody below or within this income bracket is usually regarded as belonging to the low income class. The middle income class earns between N12, 000 and N50, 000 per month while anybody earning more than N50, 000 per month in Nigeria is classified as belonging to the high income group. This classification was applied to the data and the result showed that majority of the consumers of imported rice falls within the middle and the high income class. This is represented by 60.2% of the respondents. Inte-restingly too, a little above one-fifth of the respondents who fell within the low income class also consume

Table 3. Identification of different types of local rice consumed (% of Respondents).

Variables	Ekiti	Niger	Average
Can identify rice type?	99.0	100.0	99.5
Eaten rice in the last 12 months	99.0	100.0	95.5
Frequency of consumption			
One in a day	82.9	81.4	82.2
Twice in a day	9.0	18.1	13.6
Three times in a day	8.0	0.5	4.2
Source of Rice			
Self produce	0.0	98.0	49.0
Bought	100.0	1.5	50.7
Combination	0.0	0.5	0.3

Source: Field Survey, 2008

Table 4. First criteria for selection of rice bought (% of Respondents).

Criteria	Ekiti Frequency	Valid Percent	Niger Frequency	Valid percent	Average
Absence of Foreign Matter	97	**49.7**	26	13.4	31.6
Whiteness	45	23.1	93	**47.9**	**35.5**
Rate of Breakage	1	.5	3	1.5	1.0
Shape of Grain	1	.5	10	5.2	2.7
Ease of Cooking	5	2.6	20	10.3	6.5
Stickiness After Cooking	1	.5	1	.5	0.5
Taste	42	21.5	4	2.1	11.8
Good Aroma	2	1.0	31	16.0	8.5
Price	1	.5	6	3.1	1.8
Total	195	100.0	194	100.0	100.0

Source: Field Survey, 2008

imported rice. This group probably might receive such rice as gift or are simply attempting to keep on with the joneses.

Distinguishing between imported and local rice in Nigeria

Notwithstanding, the superiority of imported rice to local rice in terms of quality, some rice consumers in Nigeria still found it difficult to differentiate between the two brands of the commodity. This may be particularly so considering the fact that the quality of some locally produced rice when properly processed using modern processing equipments, not only match that of the imported ones but in some cases, is actually better than imported rice. Quite a significant level of progress have been made by some large scale rice processors in Abaliki, Minna ,Ebonyi and Niger states respectively such that the quality of locally produced rice coming out of

these mills can actually compete with those of the imported rice in the country. Figure 1 represents the ability of respondents to distinguish between local and imported rice. On the average, 88% of the respondents can distinguish between the two brands of the commodity while about 12% found it difficult to do that. Those respondents who could not distinguish between local and imported rice were found mainly in Niger state.

Determinants of consumer preference for local rice in Nigeria

In this study, the determinant of consumer preference for rice in Nigeria is modelled around the socio-economic variables of local rice consumers, household income, prices of local rice and the physico-chemical charac-teristics of rice. In estimating the model using multinomial logit, Aroso, which is the only imported rice among all the rice samples, was set as the natural base category and

Table 5. Type of rice consumed by criteria for selection in Ekiti.

First Criteria for Selection	Name of rice Consumed in Locality		
	Aroso	Pategi	Igbemo
Absence of Foreign Matter	**73.11**	0.0	6.7
Whiteness	5.4	0.0	0.0
Rate of Breakage	1.1	0.0	0.0
Shape of Grain	1.1	0.0	0.0
Ease of Cooking	3.3	0.0	6.7
Stickness After Cooking	1.1	0.0	0.0
Taste	15.1	**88.9**	**80.0**
Good Aroma	0.0	11.1	6.7
Total	100.0	100.0	100.0

Source: Field Survey, 2008

**Table 6.** Type of rice consumed by criteria for selection in Niger.

Name of rice	First Criteria for Selection of Rice if Bought								Total
	Absence of Foreign Matter	Whiteness	Shape of Grain	Ease of Cooking	Non Stickiness of Grain After Cooking	Taste	Rising Capacity	Price	Absence of Foreign Matter
manbechi	6.7	6.7	6.7	20.0	0.0	**46.9**	6.7	6.7	100.0
ebangichi	0.0	9.1	9.1	**45.5**	0.0	36.4	0.0	0.0	100.0
lalangba	0.0	22.2	11.1	0.0	11.1	**44.4**	11.1	0.0	100.0
malelisa	22.2	11.1	0.0	0.0	11.1	**55.5**	0.0	0.0	100.0
Bisilayi	18.2	9.1	0.0	**27.3**	9.1	**27.3**	9.1	0.0	100.0
Nnagbanti	6.7	20.0	6.7	13.4	13.4	**40.0**	0.0	0.0	100.0
dokochi	0.0	**50.0**	0.0	25.0	0.0	25.0	0.0	0.0	100.0

Source: Field Survey, 2008

Table 7. Income distribution by types of rice utilize for dishes.

Income class/month	Local		Imported	
	Frequency	Valid percent	Frequency	Valid percent
<= N18, 000	2	1.1	42	22.6
>N18, 000<=N50,000	30	16.1	101	**54.3**
> N50,000	0	0.0	11	5.9
Total	32	17.2	154	82.8

Source: Field Survey, 2008
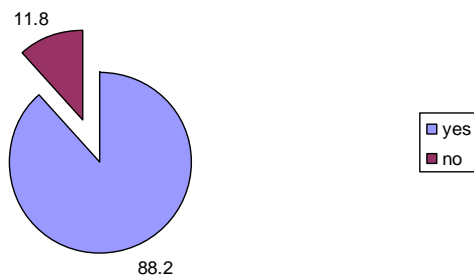
Figure 1. Ability to distinguish between local and imported rice.

the result of the analysis is presented in Table 8. This result is, therefore, interpreted in relation to imported rice (Aroso). For this reason, only the data from Ekiti state was utilize for this analysis since all the respondents from Niger claimed they only consumed local rice. The model shows some modest level of fitness with a Pseudo R-square of 42%. This, however, is an indication that there are still others variables beyond those included in this model that further explain the consumer preference for local rice in the country. Nonetheless, the regressors are jointly statistically significant at the 0.05 level, because the LR chi2(20) = 86.35. Two set of regression estimates are given having used the normalization $\beta_1 = 0$. Five of

Table 8. Multinomial logistic regression for local rice preference in Nigeria.

Rice type	Coef	Std. Err.	Z	P>|z|
Pategi				
Income	2.18e-06	0.0000308	0.07	0.944
Age	0.1501559*	0.0547444	2.74	0.006
Marital	-16.52089*	3.669827	-4.50	0.000
Howlong	-0.037004	0.0228061	-1.62	0.105
Eduate	-0.661697	0.286929	-2.31	0.021
Primactiv	0.620210*	0 .2075199	2.99	0.003
Freg	c	0.7489914	-1.43	0.154
Price	0.0078617	0.0053935	-1.46	0.145
Firstecr	0.208088**	0.1067368	1.95	0.051
Sex	0.23546*	9022692	3.59	0.000
Cons	4.608975	-	-	-
Igbemo				
Income	0.0000541	0.0000384	1.41	0.159
Age	0.1448862*	0.0685851	2.11	0.035
Marital	0.5153597	0.8481717	0.61	0.543
Howlong	-0.0378402	0.026376	-1.43	0.151
Educate	-2.009622*	0.7973646	-2.52	0.012
Primactiv	0.3057458	0 .2222881	1.38	0.169
Frg	19.122910	3.744939	-5.11	0.008
Price	-0.017928*	0.006781	-2.64	0.008
Firstcr	0.2132729**	0.1137525	1.87	0.061
Sex	1 .974674*	1.000667	1.97	0.048
Cons	11.75444	-	-	-

(Rice type==Aroso is the base outcome) * Significant @ 5% ** @ 10 per cent

Number of obs = 176
LR chi2(20) =   86.35
Prob > chi2 = 0.0000
Log likelihood = -60.091757
Pseudo R2 = 0.4181
* Wald Test of the Joint Significance of Regressors
Chi2(20) = 1507.15 Prob > chi2 = 0.0000

Table 9. Marginal effects of the regressors.

Variable	dy/dx	Std. Err.	Z	P>z
Income	0.84e-10	0.00000	0.50	0.614
Age	4.90e-07	0.00000	0.50	0.615
Marital	2.10e-06	0.00001	0.38	0.705
Howlong	-1.28e-07	0.00000	-0.45	0.653
educat	-6.83e-06	0.00001	-0.48	0.628
primac	1.03e-06	0.00000	0.47	0.641
freq	-0.0000651	0.00014	-0.46	0.642
price	-6.09e-08	0.00000	-0.45	0.651
firstc	7.22e-07	0.00000	0.45	0.655
sex	6.66e-06	0.00001	0.50	0.619

effect of a unit change in these factors on consumer preference for local rice in Nigeria is very negligible.

CONCLUSION

This study greatly underscored the significant influence of socio-economic characteristics of rice consumers on their preference for local rice in Nigeria. More importantly, the significance of the socio-economic variables is an indication that policies and programmes for the development of the Nigerian rice sector should, in addition to enhancing the physico-chemical characteristics of rice, include value reorientation and sensitization of the people on the nutritional qualities of local rice. This is very important in order to encourage consumers to further develop good taste in local rice. It is obvious from this study that cleanliness of local rice is one major way of promoting local rice consumption as such; more attention will be required right from the harvesting stage to the milling stage. Between these two stages, the two major criteria (absence of foreign matter and whiteness or colour) can be successfully handled.

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the coefficients of the explanatory variables (age, marital status, education of household head, primary activity of household head and sex of household head) significantly influence the consumer preference for Pategi relative to Aroso (imported rice). Similarly, five variables (age of household head, educational status of household head, frequency of purchase, price and sex of household head) influence significantly, consumer preference for Igbemo relative to Aroso. Since the result of individual test of variable will vary with the omitted category (Aroso) a joint test of significance of the explanatory variables (Wald Test) was carried out. The result of the Wald test further shows that the significant variables are also jointly significant and have strong implication for consumer preference for local rice in Nigeria. Meanwhile the marginal effects of the regressors presented in Table 9 showed that the

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